

ABSTRACT

A new device is provided for the electrorefining of uranium in spent metallic nuclear fuels by the separation of unreacted zirconium, noble metal fission products, transuranic elements, and uranium from spent fuel rods. The process comprises an electrorefiner cell. The cell includes a drum-shaped cathode horizontally immersed about half-way into an electrolyte salt bath. A conveyor belt comprising segmented perforated metal plates transports spent fuel into the salt bath. The anode comprises the conveyor belt, the containment vessel, and the spent fuel. Uranium and transuranic elements such as plutonium (Pu) are oxidized at the anode, and, subsequently, the uranium is reduced to uranium metal at the cathode. A mechanical cutter above the surface of the salt bath removes the deposited uranium metal from the cathode.